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ABSTRACT

This guide describes, from the perspecitve of J. Piaget's theories, the nature of intellectual handicaps and their significance for cognitive development, personality development, and interaction with the environment. A description of intellectual capacity and intellectual development is followed by an analysis of the role of intellectual capacity in personality dynamics and in a person's interaction with the environment. Among topics considered are intellectual function related to abstraction level and the role of emotional experiences in personality. The second section describes intellectual handicaps, reviews different levels and etiology, and examines the personality dynamics involved. The paper concludes with an analysis of intellectual handicaps and interaction with the environment. (CL)

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THE INTELLECT AND INTELLECTUAL HANDICAPS

Gunnar Kylén

Translated by Jane Brodin

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The Swedish Institute for the Handicapped
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THE TOTAL VIEW IS IMPORTANT

The Swedish Institute for the Handicapped has the central responsibility for the work with aids for the disabled in Sweden. The Institute's work requires that an overall view be obtained of the aids and their uses in a broad sense. In its work with aids and other measures for the disabled the Institute is to take note of, in addition to the technical considerations, the social, psychological, pedagogic, medical and economic aspects of aids and their uses in order to acquire a total view of measures that may be of use.

People of many different trades and professions come into contact with intellectually handicapped/mentally retarded people. Educational backgrounds and knowledge of intellectual handicaps vary greatly and we believe this to be one of the reasons why the intellectually handicapped as a group are poorly supplied with aids in comparison with other groups of disabled persons.

The Swedish Institute for the Handicapped considers it necessary for everybody who works with the intellectually handicapped to acquire the basic knowledge of the implications of intellectual handicaps and we have therefore produced this booklet in cooperation with the ALA research foundation of the National Association for Retarded Children, Youngsters and Adults. Its use is intended to include informative and educational applications for everybody coming into contact with intellectually handicapped people.

The Institute would like to warmly thank Gunnar Kylén, lecturer, of ALA who readily made central portions of his research available to us. Thanks also to Ann-Kristin Westman Sandberg, occupational therapist, who took responsibility for the text in the Swedish version.

The Swedish Institute for the Handicapped

FOREWORD BY THE AUTHOR

In the 1960s I underwent some experiences which made me realize that the conception of the character of mental retardation was basically faulty. The practical results achieved by nursing home supervisors Bertil Litzén and Saga Höglund in their work with mentally retarded persons have influenced my attitude towards mental retardation more than anything else. By allowing severely mentally retarded persons to exploit their abilities to the full, they have shown that the negative effects of intellectual handicaps on adaption are less than previously believed.

Practical work by Ture Paulsson and the staff of Liljeholmsgården, by Nils Håkansson and Astrid Andersson and others in ALA's (the Swedish foundation for adaption to life and work) sheltered workshop and in residential centres, has confirmed the impressions I received from Bertil Litzén and Saga Höglund. Saga Höglund pointed out that it was inconceivable for her to treat a person disrespectfully or insultingly regardless of whether it could be assumed that the person in question could comprehend this as such or not. In her view treating people disrespectfully was in itself insulting. Many symptoms and disabilities that in the past were felt to be linked to mental retardation and brain damage have disappeared when the subjects were treated with the respect due human beings by Saga Höglund, Bertil Litzén, Ture Paulsson and Nils Håkansson.

I decided to study the extent of the actual limitations resulting from mental retardation when in 1968 I was given the opportunity of starting research work at ALA under the auspices of FUB (Swedish Association for Mentally Retarded Children, Youngsters and Adults), through Karin Stensland and Bengt Junker.

The intellectually handicapped, due to their retarded development, have a simpler and more concrete picture of reality, the wealth of which depends on how stimulating their environments have been.

It is my intention in this booklet to describe this from the perspective of Piagets's theory of intellctual development capacity, structured and adapted to meet my needs, i.e. to

understand the nature of intellectual handicaps and their significance for cognitive development, personality development and the interaction with the environment.

This work therefore starts with a description of intellect and intellectual development and this is followed by an analysis of the part played by the intellect in personality dynamics and the interaction with the environment. In the second part of the work, intellectual handicaps and their effects on personality dynamics and the interaction with the environment are described.

Gunnar Kylén

INTRODUCTION

"A mentally retarded person is someone who, due to a substantial reduction in the reasoning functions (intellect) which occured during the development period, has difficulty adapting himself to the world around him"
(Grunewald in "Medical Care")

The definition is in three parts, viz.:

1) "substantial reduction in the reasoning functions"
2) "which occurred during the development period"
3) "has difficult adapting himself to the world around him"

Each and every one of these parts is accompanied by a special problem. There is a considerable difference between a person born intellectually handicapped and one handicapped in an accident at the age of ten. There is also a great difference between someone who has lived a stimulating life and someone who has been emotionally and sensorially deprived (too few sensorial experiences).

I will not be addressing these matters in any further detail but will concentrate on describing reduced intelligence.

In order to understand the implication of intellectual handicaps one must know:

1) what intellect is
2) how intellectual development occurs
3) what intellect means for human beings
4) how intellectual development is inhibited, injured or retarded
5) what intellectual handicap means for the handicapped person

These matters are dealt with in more detail in the following text.

WHAT IS INTELLECTUAL CAPACITY?

It is necessary to define intellectual capacity in order to understand the implications of an intellectual handicap. Intellectual capacity encompasses a concept of reality that is built up by processing sensorial experiences and is arranged by the thought process. The arrangement of the concept of the surroundings is used with the help of the thought process. Symbols (pictures and language) are used to assist the thought process. Pictures and language are also important for communicating with other people.

Sensory impressions are arranged into five different categories, viz.: space (answering the question 'where?'), time (answering the question 'when?'), quality (answering the question 'what?'), quantity (answering the question 'how much?') and cause (answering the question 'why?'). The way the arrangement is made into these categories is the result of biological maturity in interplay with the experiences the individual has acquired. The ability to perform thought operations and to understand and use symbols (pictures and language) is developed in the same way.

Arranging and rearranging sensory impressions

The concept of reality is created by arranging the sensory impressions which helps one to obtain a structure in terms of space, time, quality, quantity and cause.

The concept of space enables one to differentiate between here and there, behind, under, on this side and beside. Gradually one learns how to find the way to different places. One can think out short cuts, learn to find the way round the neighbourhood and to other places.

One can think out short cuts, learns to find the way round the neighbourhood and to other places. One learns how to use aids for determining space, e.g. maps. The concept of space increases and knowledge is acquired of countries and seas, the earth, the moon and the sun, of the universe and infinity.

The concept of time enables one to differentiate between the concepts of the present, the past and the future and also between the concepts of before and after. One comes to understand the meaning of concepts such as 'as soon as we have eaten' and 'before going to town'. Later in the development one understands that time can be divided into days, weeks, months and years and one learns how to tell the time. A feeling of the historical past, the future and eternity are acquired. Relating events to time enables plans to be made.

The concept of quality enables one to understand that objects exist and that they do not change colour, shape or size and that they do exist even if one cannot see them. One learns to make a distinction between different qualities like red and yellow, round and angular, light and heavy, high and low, rough and smooth, sweet and salt, sharp and blunt, strong and weak, etc. One learns to differentiate between dogs and cats, trees and bushes.

The concept of quantity enables one to differentiate between more, less and as much as, several, fewer and as many as, longer, shorter, as long as, etc. Gradually one learns to count to one, two and three and to understand concepts like half, nothing, everything, some singular and plural. One learns natural numbers and irrational numbers, fractional numbers and other numerical quantities.

The concept of cause means that one can make a connection between events. For example, one learns that ingesting food satisfies hunger, if one is silent and inactive nobody will hurt you, or that one will be appreciated if one takes the initiative. One experiences that one feels wet when it is raining, and you understand that if you feel cold you can put on a sweater and get warm again.

Thought operations

The first type of intellectual function is thus to arrange one's impressions in terms of space, time quality, quantity and cause. Arranging impressions makes understanding reality easier and the actions performed become more discerning. Arranging impressions also provides people with an overall view and makes it easier to think about changes.

The second type of intellectual function is thought operations. Manual operations can be differentiated from thought operations. Rearranging the furniture in a room can either be performed in reality or in the mind. Refurnishing a room in reality is a manual operation. Rearranging the furniture in a room involves the mind dealing with a concrete change in a concrete room. This process is termed a concrete thought operation. Thinking without having concrete objects in mind is termed an abstract thought operation.

The symbol function

Symbolization is the third type of intellectual function and is based on the concept that objects, events and characteristics can be represented by a sign, a symbol. Before understanding this, one reacts to signs in the same way as signals associated

with certain events e.g. 'When the refrigerator door clicks, it will soon be time to eat', 'When you hear the word 'out', you put on your coat'. The signals are the first stimuli in a chain of associations, but the meaning of the signs is not understood. Once it is grasped that everything can be represented using pictures or sounds then one can ask what everything is called. The picture symbols resemble the objects they represent, while the semantic symbols, e.g., letters of the alphabet, are important aids in thinking, learning, memory and communication.

Intellectual function and category of contents

Once the experiences have been arranged actions or thought operations can be performed along the lines of these models. If, for example, an individual has a concept of the space enclosed by a certain area, then it can be located and one can find one's way there (action) or one can just think of the routes to different places (thought operations). One can learn how to reproduce that which has been experienced and arranged using a picture symbol or represent it using a semantic symbol.

Anyone having a concept of space can think of the routes to different places (thought operation) or go there (action operation). That which has been experienced or arranged can be reproduced or represented.

ABSTRACTION LEVEL IN THOUGHT

Arrangement, operations and symbolization can be performed at different abstraction levels. The abstraction level increases during intellectual development.

The abstraction level in arrangements of experiences

Each of the categories of space, time, quality, quantity and cause can be arranged at different levels.

Arrangement is performed at the first abstraction level through comparison

The first abstraction level

The simplest operation is the comparison of two experiences in terms of position, time, quality, quantity or cause. A comparison is made between the mug in front of you and your memory-picture of a mug and in this way it is recognized; two positions are related to each other: 'here' and 'there'. One learns to differentiate, at first intuitively and them more consciously, 'now' from 'then' and to distinguish 'as much as' from 'more' and 'less'.

The comparison of two experiences can be extended to relations between three, four or more experiences, so forming a chain. Several events form a chronological sequence, several places come together to make the way to the shop, several quantities form 'much - more - most'. Several actions form a chain of actions. First I see the food on the plate, then I pick up the spoon, move it to the plate and then to my mouth, I suck and finally swallow.

The second abstraction level

Many experiences grouped together gradually lead to an understanding of the three dimensions of space. At the second abstraction level one comprehends the immediate vicinity as a total entity. Time first becomes a total entity when it is understood that everything occurs in order and sequence and that everything can be related to something else in terms of time, e.g. 'When we have eaten, we will go shopping'. Mug, glass and cup are linked together because they are all used for drinking and in that way they form a group of concrete objects. Concrete numbers are experienced and understood.

When some things fall on the floor they break, others do not. Certain simple cause models are experienced in this way at the second abstraction level.

At the second abstraction level you know that the mug, glass and cup are related because they are used for drinking.

The third abstraction level

On the next level one experiences the different categories in general terms, thereby moving outside one's own experience. General structures are formed, e.g. the general classifications of objects that can be used to drink from, including those that are known from first-hand experience, those that have never been seen, those that have existed, do exist and will exist in the future. The concept of time is extended to the past and the future, the concept of space encompasses the earth and space, the concept of cause includes laws and principles, quantities can be nought or infinite. Different patterns of sub-structures are formed in each category.

At the third abstraction level one experiences the different categories in general terms, one knows that there is a general category of objects to drink from, e.g. even such a remote object as a camel rider's water container.

The fourth level of abstraction, etc.

At the fourth level of abstraction, which corresponts to normal intellectual capacity , the categories are abstract and lack concrete contents. For example, one knows that there are as many

even digits as odd and that they both are so many that they cannot be counted. One can think hypothetically, i.e. reason on the assumption that something is different from what it really is. One can understand that proverbs should not be interpreted literally.

The higher the abstraction level, the better the perspective and overview. The cost is less concretion. On the other hand, gains in concretion are made at the cost of the overall view.

Thought operations and abstraction level

Thought operations are dependent upon orderly arrangement and experiences. Orderly arrangement is more or less pervasive depending on the level of abstraction reached. At lower abstraction levels thought operations are well organized but are simple and 'local'. Simple associations and thought chains do not permit flexible thinking, but nevertheless actions are entirely possible. Groups of concrete experiences allow a certain amount of flexibility in thinking. Once the general structures of space, time, quality, quantity and cause, which appear in the third abstraction level, are present then conscious thought operations are possible.

Abstraction level in the symbolic function

Symbolic function also develops at different abstraction levels. At the first level one does not understand the function of the symbols at all. All stimuli are signals, the level is prelinguistic. But there is a non-verbal communication ability and this is important for the interaction between human beings. At the second level picture symbols and the spoken work are understood, but it is not until the third level that the function of the written work, which is more abstract than the spoken word, is comprehended.

Symbols which describe situations must always be preceded by experiences of the situation that they describe, otherwise the result is 'parrot-talk'. Thus qualitative categories (classes) must be formed before they can be given names. These structures

cannot be named until thought has given structure to the sensorail experiences. The limits of the thought process (as well as the limits of language) are set at lower abstraction levels of the experiences acquired of the concrete reality. At higher abstraction levels language is an implement necessary for thought and thus demarcates its limits.

INTELLECTUAL DEVELOPMENT

The level of intellectual abstraction develops normally with age. When something new of qualitative importance appears, e.g. the understanding of the fact that phenomena can be described in words, change is not sudden and clear-cult, but is gradual, somewhat similar to spring turning into summer.

Thus the orderly arrangement of sensorial experiences in terms of space, time, quality, quantity and cause is divided into stages, as are thought operations and symbolic functions. The three functions develop in parallel so that on the whole each stage corresponts to a certain stage in other areas, as shown in the table below.

Abstraction level	STRUCTURING	OPERATION	SYMBOLIZATION
4	abstract structures	abstract operations	abstract language
3	general structures	concrete operations	written language
2	small surveyable structures	intuitive operations	spoken language pictures
1	simple pairs and chains	action operations	non-verbal communication

Fig. 1. Intellectual function related to abstraction level

I a person's concept of reality is known then the abstraction level his intellect has reached can be determined.

A normally developed person thinks at the first abstraction level from birth until about 1 1/2 - 2 years of age. The second level lasts up to the age of 6 or 7 and the third level until 11 - 12 years old. The abstraction level of thought does not develop any further after the age of 15 - 20. But if intellectual development was disturbed at an early stage by emotional disturbances or experience deficiencies then intellctual capacity can subsequently rise to the correct level for the individual if the disturbances or deficiencies are rectified.

An over-intellectual person develops faster through the stages and as an adult will reach a higher abstraction level, while an under-intellectual person develops slower and will remain at a lower level of abstraction as an adult.

The functions, categories and abstraction levels of intellectual capacity can be described by a three-dimensional diagram, see Fig. 2.

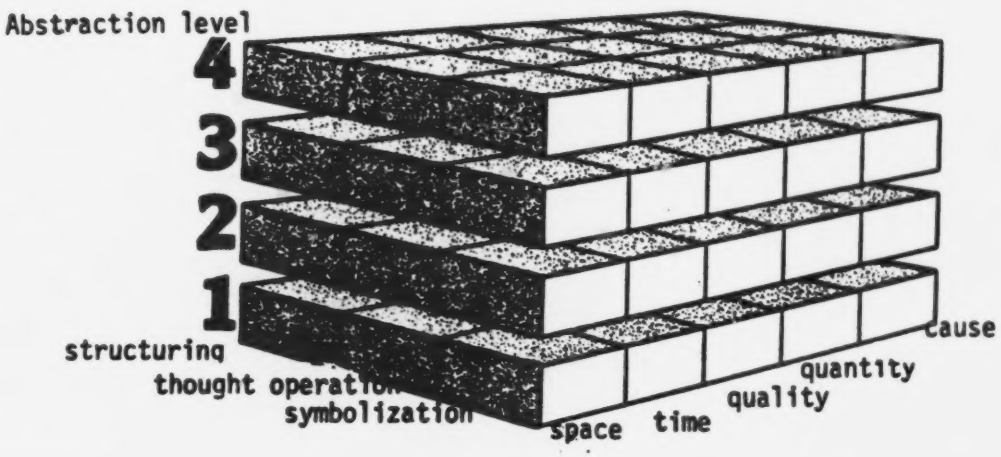


Fig.2. Functions, categories and abstraction levels of intellectual capacity

Thus I count:

- three functions (structuring, thought operations and symbolization)
- Five categories (space, time, quality, quantity and cause)
- four abstraction levels.

Maturity, experience and intellectual level

The intellectual level is, as described above, a question of the abstraction level in thought. The intellectual level depends on the biological maturity of those parts of the nervous system that are used to think. In the same way as muscles are needed for action, the brain is needed for thinking. What one thinks depends on the experience gained from one's interaction with the environment.

This can be expressed as follows: The abstraction level depends on the biological maturity of the brain, while the content is a product of the abstraction level afforded by the maturity of the brain and the experience gained through the interaction with the environment (See Fig. 3) If the brain matures slower and remains at a lower maturity level than average then this will result in a biologically conditioned limit to the abstraction level of thought which cannot be increased through training. But the experiences gained at that level can be rich, adequate and extensive.

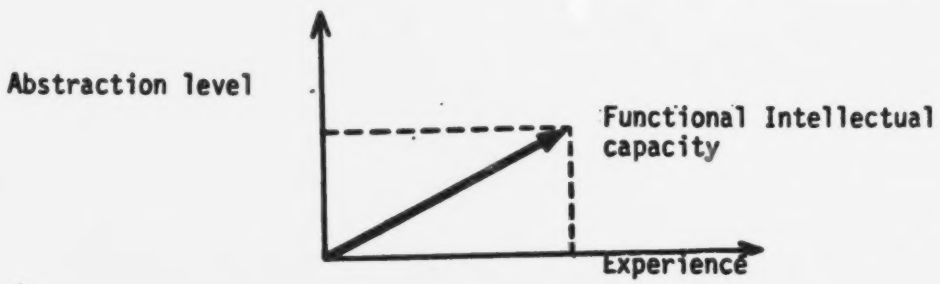


Fig. 3. The funcitonal intellectual capactiy is the product of the biologicallly determined abstraction level and the experineces the individual has the opportunity to undergo.

Experiences give thoughts their content. If experience is missing a thought pattern will not develop. A person who lives in a pedagogically poor environment can then seem to be less intellectual than in fact he is. If a certain but insufficient stimulation is provided then an adequate level of abstraction makes itself evident, but in an poor way.

Two people can thus have the same abstraction level in thought but a different wealth of contect. It can also be said that they possess the same intellectual capacity but with different amounts of valuable experiences. This can be shown graphically, see Figs 4 and 5.

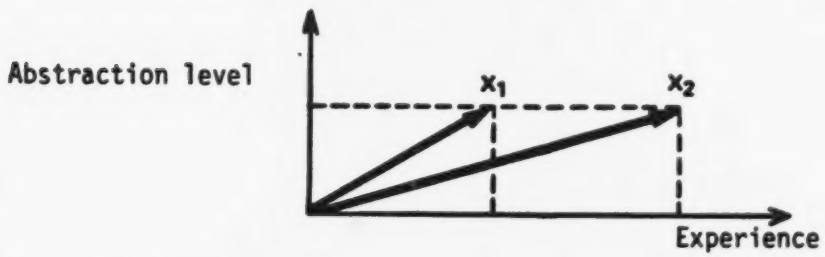


Fig. 4. In the above figure X_1 represents a person with somewhat limited experience while X_2 represents a person at the same intellectual level but possessing wider experiences.

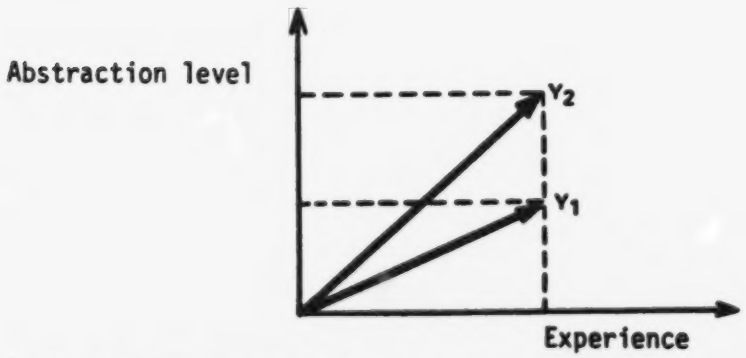


Fig 5. The persons in Fig. 5 possess the same experience but Y_2 is more intellectual than Y_1 and therefore comprehends reality in a more abstract and comprehensive way.

It is often difficult, if not impossible, to determine the actual intellectual capacity a person possesses. But the correct conclusions can often be reached by studying the wealth and quality of the experiences which may have been gained, for example, from home and school. If the home or school are poor then there is a greater likelihood that all the resources possessed by an individual are not being fully utilized.

THE PART PLAYED BY INTELLECTUAL CAPACITY IN PERSONALITY DYNAMICS

Intellectual capacity gives an individual an understanding of reality. This is achieved through the arrangement and learning of sensorial experiences. Naturally an objective concept of reality is a factor in the interaction with the environment. The concept of reality, such as it is, is weighed by the person vis-a-vis his emotions and needs. Weighing is performed in the thought process for decisions and the result is decision making which in its turn can initiate an action related to reality. The action can provide varying amounts of information and emotional yields.

In the thought process for decisions a weighing is made between emotional information and knowledge. The balance between will and reality was well expressed by the artist Evert Lundquist who said that 'You must feel what you want and know what you do'. This can also be illustrated by Fig. 6.

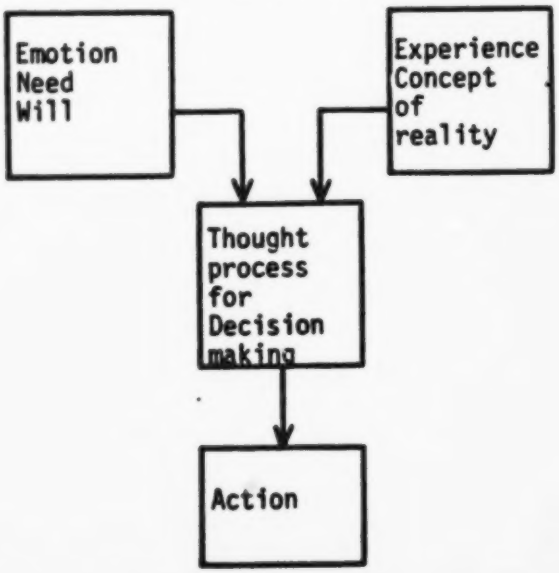
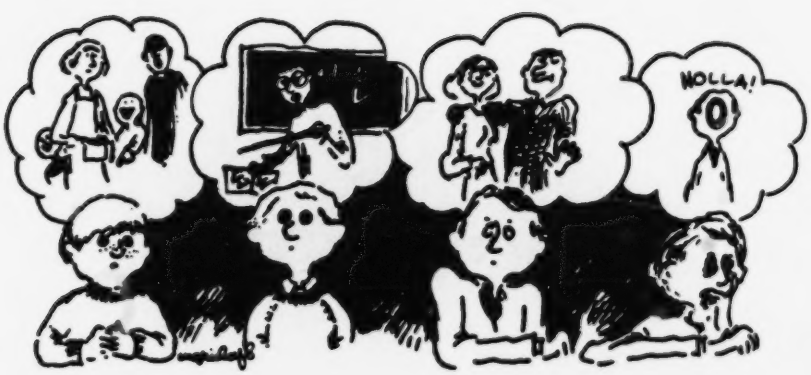


Fig. 6. Reconcilation in the thought process for decisions between will and reality

Emotional aspects

Emotional experiences have their origins in the information generated by needs. Emotions can have positive or negative associations, depending upon the possibilities a person has to satisfy his needs. Emotional thought processes rework emotions. This processing, together with the experiences gained from the surroundings, results in people learning to like or dislike people, things and events. This creates attitudes and interests. People also learn to like or dislike characteristics that they themselves possess. In this way self-esteem is built up. Self-esteem includes one's regard for oneself, the way one thinks one ought to be and how one would want to be. Together with knowledge of oneself, self-esteem forms an understanding of oneself.



Experiences gained from surroundings and emotional experiences result in one learning to like or dislike one's own personal characteristics. Self-esteeem is created in this way.

Aspects of knowledge

Aspects of knowledge are based on the fact that experiences are gained by forming a perception of the surrounding reality. The sensory impressions (perceptions) are processed by the intellect; this can also be termed conceptional thought (compare with emotional thought). Pre-processing occurs first in perception so that figures are created.

Information from perception is processed in the intellect so that experiences acquire forms and it is on this that a concept of reality is built up. A concept of space, time, quality, quantity and cause is created at different abstraction levels. This picture of reality contains the goals for the satisfaction of needs and the ways to reach these goals.

Once experiences have been structured in the intellect they can be learnt och remembered (long-term memory). There is a memory between the sensations experienced and the intellect which retains impressions for a short time so that they are readily available for the intellect. This memory is called short-term memory and is in function for about 15 seconds. The short-term memory can accept a limited number of units of information. For example, a telephone number can be forgotten after 15 seconds unless a conscious effort is made to remember it. If somebody counts out ten digits only the first five or seven can be remembered and them they are all forgotten unless one repeats the digits for oneself.

The goals for our needs are present in our surroundings. The concept of reality helps us to find the goals.

The total personality structure

The total personality structure can look something like this:

A need generates a feeling of discomfort, e.g. thirst, which one wants to get rid of. To succeed in this one must first have learnt to differentiate the feeling of thirst and from experience know what steps to take to eliminate it. One must also know that if remedial action is taken a feeling of relief will result (concept of cause). Experience has taught you enough about reality to know that some drinkable liquid, e.g. water, will quech thirst (concept of quality). You also know where water is available and how to get there (concept of space), how long it takes to reach and how much you need (concepts of time and quantity). Maybe you know when and how often you usually get thirsty (concept of time), so enabling you to plan for it.

The goals and the ways to achieve the goals in order to satisfy our needs can be found in our surroundings. The concept of reality helps us to find the goals and the way to achieve them as well as to plan for the future.

Naturally this is a simplified picture of the personality dynamics, but it is good enough as a basis on which to an understanding of the part played by intellect. It is necessary to obtain such an understanding in order to be able to comprehend the effects of intellectual handicaps on personality dynamics and the interaction with the environment.

If the emotional aspects are now combined with the aspects of knowledge we have the main features of personality structure and personality dynamics, see Fig. 7.

This psychological structure and dynamic can be termed the informations aspect of behaviour. Here information is both emotion-related and knowledge-related.

However, this only takes up one aspect of the total problem. Information must be reflected in a biological base. Information consists of patterns of sensorial impressions and emotions that cannot exist without a biological base.

Therefore in addition to the psychological aspect there is also a biological aspect. Psychological and biological dynamics interact with the environment. There are two essentially different aspects in the environment, the social and physical. The social primarily comprises fellow human-beings. The physical environment forms the material aspect.

The social environment includes people, social relationships, groups, organizations and society. The social structures contain social dynamic with roles, standards and relationships. One can communicate with the social environment.

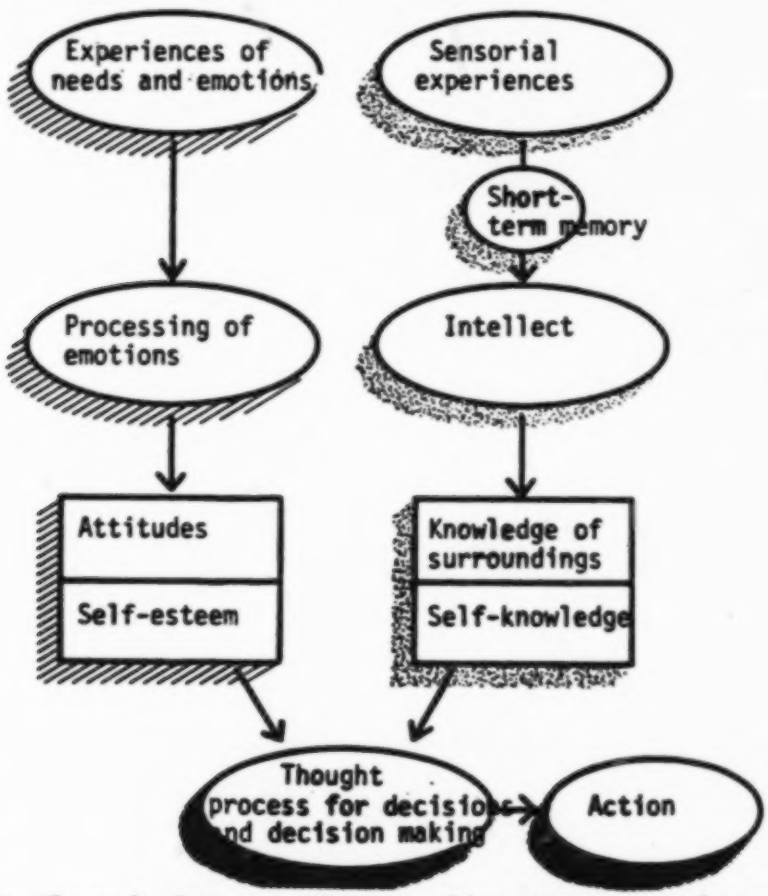


Fig.7. The main features of personality structure and cognitive development.

The physical environment contains the natural world and created matter - forests, lakes, mountains, fields and meadows. There are highways, bridges, towns, cars, boats, buildings, chairs, tables, beds and tools such as scissors, spoons, machinery, calculators, etc. The natural world and objects have a certain fixed relationship with each other and interact in different ways.

The environment can also be divided up on the basis of function into home, school or work and recreation. If the divisional groups are combined, structure and development are obtained in:

the social and physical aspects of the home
the social and physical aspects of school
the social and physical aspects of work
the social and physical aspects of recreation

The total problem area therefore contains five main aspects, viz.:

the individual's psychological structure and dynamic
the individual's biological structure and dynamic
the environment's social structure and dynamic
the environment's physical structure and dynamic
the structure and dynamic of the interaction

THE PART PLAYED BY INTELLECTUAL CAPACITY IN THE INTERACTION WITH THE ENVIRONMENT

The qustion of interaction with the environment is a matter of the relationship between an individual's needs, wishes and abilities and the environment's resources and demands. The objects we need are found in the environment, i.e. the things (food, bed, car) we need to meet our needs, and this also includes fellow human beings. To what extent does an intellectual handicap make interaction more difficult at different levels? I have previously touched on personality structure, the

place intellectual handicaps have in it and the part it plays and its significance in personality dynamics. But the structure and dynamic of interaction must also be analysed in order to clarify the question of the interaction with the environment.

Individuals are physically influenced by the environment, by e.g. food, sunlight, air, blows and tablets. Individuals understand their physical environment by recognizing different objects or by knowing the type of object they perceive. Individuals also deal with their physical environment, e.g. move about in it, grasp, carry and divide things into parts. As social subjects, human beings interact with other social subjects through communication. When communicating, human beings understand and are understood. Communication is effected both in terms of emotions and knowledge.

The ability of the intellect to perform structuring helps individuals to understand their surroundings at the abstraction level with the use of the perspective that their intellectual level allows. Such an orderly arranged concept of reality helps to guide an individual's actions and the way he deals with the environment. The consequences of actions can be related to both emotions and knowledge and the intellect assists in understanding the consequences.

Actually the structures in operations and perception occur in the interaction with the environment. Structuring and performing are mutually dependent upon the interaction with the environment.

The symbol function also plays an important part in the interaction with the environment. The desinations given to objects, characteristics and events support (or mislead) thoughts and memory. Semantic instructions help to control actions. Language facilitates both comprehension and performance and plays a particularly important part in the communication between human beings.

INTELLECTUAL HANDICAPS

At present it is not possible to properly define 'intellectual handicaps'. The structure of the problem is not clear and the concept apparatus is ambiguous. I will attempt to define intellect handicaps on the basis of the discription of intellectual handicap presented in this text.

The handicap may involve difficulties in generally structuring one's concept of reality, in performing thought operations or in using language (in a wider sense). These difficulties are due to a low abstraction level in the thought process, i.e. a thought process of a more concrete character. This can be called an intellectual handicap due to inhibition and will be described in more detail later. The border between normal intelligence and handicap is usually put between the third and fourth abstraction level for adults. According to another definition the border lies at an intelligence quotient of 70, i.e. 70% of normal development. In practice both these borders are at the same level.

In Sweden intellectual handicaps occurring during the development period are termed mental retardation. The choice of this term is unfortunate as the handicap does not apply to the entire mental apparatus and is not always a case of retardation. In Sweden the development period is given as up to 16 years of age. If it is necessary to define the problem in more detail then one should state the abstraction level that the child's thought process had reached when the handicap occurred and then the nature of the handicap should be related to the level of maturity achieved by the thought process. Intellectual handicaps occurring as an adult are termed dementia or senile dementia if the person is of advanced age.

Mental retardation

This was previously called sensory retardation, backwardness or mental deficiency. One 19th century theory had it that in

psychic illness the sense could be sick or blunted and this gave rise to mental illness or mental deficiency. It the blunted senses were trained then everything would improve. Today this is regarded as erroneous.

'Backwardness' and 'mental deficiency' indicate that it was believed that the handicapped person deviated from normal in several respects, indeed in his entirety. At the present, I think that 'intellectual handicap' best expresses this condition. If this is not acceptable then one could say 'of reduced intelligence'. I have decided to use the terms 'intellect' and 'intellectually handicapped'.

However, the negative connotations of these expressions do not disappear simply because a different work is used. The words chosen will have negative connotations for as long as intellectual handicaps are held in contempt.

DESCRIPTION OF THE HANDICAP

Inhibition, injury and retardation

Like many characteristics, intelligence varies to the extent that some people are highly intelligent, the majority are of normal intelligence and some people are of low intelligence. This is completely normal. The intellectual profiles of people without brain damage are realtively similar in the sense that different types of intellect are seldom found at different levels with the exception of those instances when it overlaps the border between two levels. It almost never encompasses three levels. But within these parameters differences in the development of the various sides of intellect are concountered. This makes possible the development of individual intellectual profiles with the various abilities situated at approximately the same level of abstraction. This type of intellctual handicap is best called intellectual inhibition.

Matters are different with intellectual handicaps caused by injury. These are due to a part of the brain, which is required for intellectual functions, being damaged. The way this is viewed depends to some extent on the way one regards the relationship between the biological and psychological aspects of human beings. In my opinion, information consists of patterns of experiences. But information must be reproduced on something - it is dependent on paper, magnetic tape or the brain for its existence. If the base upon which information is reproduced is damaged, then the information and the formation of information will be damaged. This means that the basis for certain specific information functions can be damaged while others remain unaffected. The effects of the interplay between the damaged and healthy functions (interaction effects) can make the picture more complicated. The intellectual profile can be even if all centres are damaged equally, or very uneven if some are severely damaged and others only slightly or not at all.

I have previously pointed out that intellect must be used in order to develop. Adequate experience is not simply desirable but necessary if intellectual development is to take place unhindered. An environment that is physically and pedagogically poor leads to mental 'starvation' which is normally called sensory deprivation (or sensory restriction in less severe cases). The consequences of long-term sensory deprivation are devastating.

It must be emphasized that it is not just an uninspired environment that causes disturbances in the intellectual development, but uniformity as well. If someone lives in a beautiful and nicely furnished home, day after day, month after month and year after year without any noticable change, then their environment is impoverished. Another factor that has the same effect is a lack of interaction between peoples's actions and their effects on the environment. This can occur, for example, if a person's actions seldom or never produce results or if the outcome is haphazard. This can be the case at institutions with 'necessary' collective routines or in conjunction with a change of staff who use different work procedures. Such experiences or lack of experience produce symptoms such as difficulty in concentrating, low intellect (i.e.

a low abstraction level in the thought process), less flexible thought operations and poorer language.

Moreover, the effects of emotional deprivation can impair development. If a person does not feel basically secure, i.e. lacks a feeling of justification for his existence, or if he does not feel that he is entitled to his own will or to take the initiative, then he too will not be able to exploit the opportunities that present themselves. In fact this is pivotal. Without the wish to learn any available learning opportunities are not utilized.

In order for intellectual development to proceed unimpaired, a person must be sufficiently mature emotionally and must receive sufficient sensorial-pedagogic stimulation for the abstraction level he has in his thought process. Both sensorial and emotional stimulation should interact appropriately with his actions and needs.

An intellectual handicap due to inhibiiton consists of the development of the abstraction level of the thought process taking place slower and remaining at a lower level than is normal for an adult.

An intellectually handicapped person structures, operates and symbolizes space, time, quality, quantity and cause in a more concrete way. It could even be said that an intellctually handicapped person possesses an ordered conception of reality but that this is simpler and more concrete than that of a person of normal intelligence. Intellectual handicaps limit perspective.

Abstraction levels in normal children are similar. This has resulted in comparisions being made between e.g. children of normal intelligence and intellctually handicapped adults, but it is important to remember that it is principally the abstraction levels in the thought processes that are the same.

The slower rate of development means that at each stage of his development the intellectually handicapped person has time to

gain more experience than a child who develops normally. Consequently he cannot be likened to a child in terms of functional intellect.

In forder to indicate the difference I have chosen to call the intellectual levels (the abstraction levels of intellectually handicapped people) A, B, C . It can, for example, be said that an intellectually handicapped person at level B is on the second abstraction level. A child of normal intelligence is at the same abstraction level at the age of 2 - 7.

Using certain reasonable figures for the normal development of the abstraction levels enables the development of the intellectually handicapped to be represented diagrammatically as in Fig. 8.

An intellectually handicapped person who remains at level A as an adult is at level A for the whole of his development, but develops through sub-levels and experience. Someone who develops to level B as an adult will be at level A between 5 and 15 years old. A person developing to level C as an adult will leave level A between 3 and 6 years old and level B some time between 6 and 15 years old.

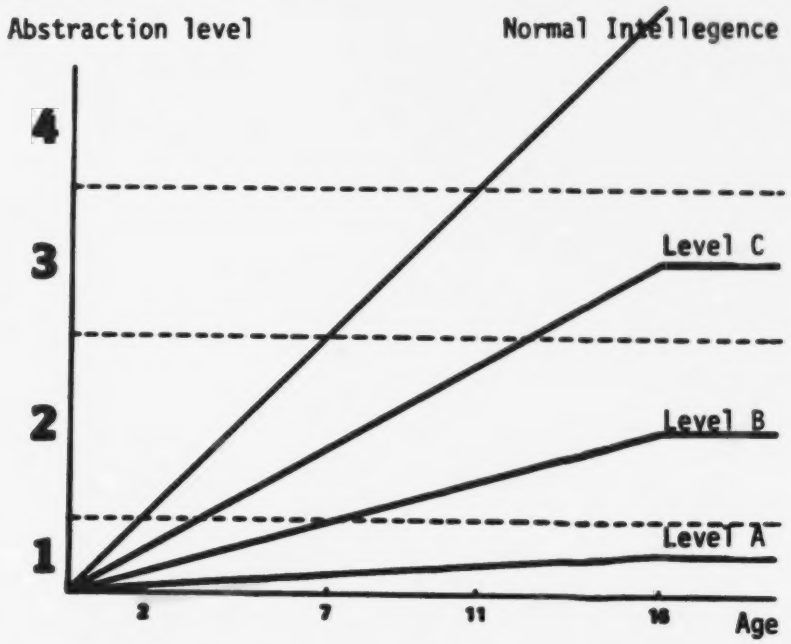


Fig. 8. Intellectual development of persons with normal intelligence and those with intellectual handicaps

In addition to the abstraction level in the thought process the intellectually handicapped person has another primary handicap and that is in the short-term memory. While the short-term memory of a person of normal intelligence has a capacity for 5-9 units of information an intellectually handicapped person can only magage 3-7 units, or even less if the handicap is severe. If, for example, an intellectually handicapped person is asked to dial the telephone number 38 59 64, this proves to be too much to learn by heart, while a person of normal intelligence remembers it until he has dialed the number or he repeats it until he remembers it. The reason why the handicap in the short-term memory and the handicap in the abstraction level of the thought process accompany each other is not clear. It has been speculated that one is the consequence of the other but this has not been provided.

Level A

People at level A understand and react to their immediate surroundings, here and now. Space and time perspectives are very limited. The conception of time consists more or less of well-informed expectations of what is going to happen next. Their actions are guided by intuitive associations and chains of thought which enable them to act in a discerning manner vis-a-vis well-known objects in daily routines. Bed = lie down, chair = sit, spoon = eat with, plate = eat from, mug = drink, coat = put on and go out etc.

They cannot talk but they can use signals in the form of body language and sounds. How much depends on the susceptibility of the people around them. They become apathetic if nothing they do produces clear-cut and, for them, meaningful results, e.g. if the course of events is only determined by routines and their individual needs are never taken into consideration.

Level B

People at level B understand their immediate environment as a whole entity but lack an overall view of things that are not

present. They can distinguish clothes, furniture, kitchen utensils, etc., into diffferent classes but their own experience is limited. They do not reflect very much on what they have experienced. Their memory does not limit that which they have experienced to the things that are present. Their time perspective has increased to include one or more days, perhaps they can even grasp weekly cycles.

They can obtain an overall understanding of the immediate vicinty and links can be made with their immediate surroundings and places that are not frequently visited. Possibly there are several 'immediate vicinities' with a line between them, e.g. day care centre and home. They understand all the objects from daily life that are often used or seen in use. The quality of the objects is consciously investigated and differentiations made. A division is made between nothing and something and between a little and a lot. Often some or even a lot of numbers can be counted. Picture symbols, e.g. photographs or mirror images, are understood. They can talk, the vocabulary increases and sentences become more or less complex. But they are still very dependent on actions and difficult thinking out a change, e.g. refurnishing, if they have not seen it being made.

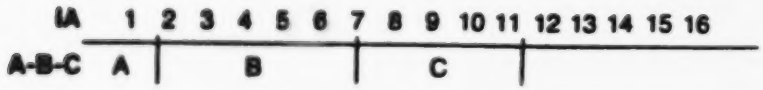
Level C

A general conception of one's surroundings emerges at level C. One understands that there are places other than those personally experienced, that there is a present and a future. Conceptions of time and space are general. It is understood that there are different routes from one place to another and short cuts can be worked out. The concepts of days, weeks and years start to take shape. All this provides the overall view that was previously missing. The classification of objects also becomes generalized. One understands that there are people existing that one has never met, dogs one has never seen and food that one has not eaten. This increases the ability to deal with unknown environments and changes. One starts to understand quantities and eventually counting 'as many numbers as there are' is mastered. One understands the difference between one and two, one and three, etc.,

and this enables the ability to add and subtract to be developed. This is subsequently followed by the ability to multiply and divide. One even gains an idea that causes - consequences occur in certain general patterns. One can learn to read and write which is a great help in finding the way or reading instructions, e.g. recipes. Reading and writing is also an important memory aid. But one still has difficulty working with problems in which many factors interact. One has difficulty in finding several altenative solutions oneselt and hypothetical situations cannot be envisaged. Conceptual creativity is limited and it is difficult to regard something which is tried and tested in a new light. One cannot understand symbols of symbols and this is necessary e.g. in 'counting' with letters instead of figures (e.g. 'x' and 'y') and in transferring money between different accounts. Goodness consists of being kind, it is not understood as an abstract concept.

Division into levels, intelligence age and intelligence quotient

This basis division into levels helps us understand how intellc-tually handicapped people experince their surroundings and is very important. The division is most closely related to the concept of intelligence age. Intelligence age is the level of performance that is average for a certain age. An intelligence age (IA) of five is consequently what five year olds can manage on average. A person who can manage what is average for a five year old has an intelligence age of five regardless of his physical age. He could be three years old and a very early developer, five years old and normal or ten years old and late. The division into levels A, B and C can be direclyt compared with intelligence age as follows:



The intelligence quotient is obtained by dividing the intelligence age by the chronological age (CA) and multiplying by one hundred ($\frac{IA}{PA}$ x 100). This figure is the percentage of average development. A three year old with an intelligence age of five has an intelligence quotient of 167($\frac{5}{3}$ x 100 = 167) . A five year old with an intelligence age of five has an intelligence quotient of 100 ($\frac{5}{5}$ x 100 = 100) and a ten year old with an intelligence age of five has an intelligence quotient of 50 ($\frac{5}{10}$ x 100 = 50). It can also be said that someone with an intelligence quotient of 50 has achieved 50 percent of the average development. Intelligence stops developing (although experiences continue) at around 15-20 years old.

WHO (World Health Organization) uses the intelligence quotient for its division into levels and makes the following divisions:

Designation	IQ	Code*
Severely intellectually handicapped	-20	314
Badly intellectually handicapped	20-35	313
Moderately intellectually handicapped	35-50	312
Slightly intellectually handicapped	50-70	311

The borders are arbitrary and are based on statistics. They say nothing of pedagogic or psychologic-pedagogic significance. If the quotient is divided by one hundred and multiflied by a person's chronological age then the result is the intelligence age which gives information of more practical use. The intelligence quotient of children cannot be broken down into the division into levels A, B and C other than in individual cases with the use of a conversion factor. On the other hand this can be performed for adults, for whom both the intelligence age and intelligence quotient can be assumed to be constant.

* According to WHO's classification of diseases.

The relationship is as follows:

A-B-C	A	B						C								
IA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IQ		10	20		30	40		50	60		70	80			90	100
WHO	severely			badly		moder-ately		slightly			borderline case			normal intelligence		

The disadvantages of the latter basis for division include the fact that it does not give the individual intelligence profile. Although the general level of intellect is usually at the same level in individuals, they can have different levels of development in different intellectual aspects.

The abstraction level in the conceptions of space, time, quality, quantity and cause should then be assessed using the intellect structure described earlier as a starting point. In order to obtain a true picture of the handicap consideration should be paid to both the structuring ability and the ability to perform thought operations and symbolization. This is both possible and of practical use.

Intellectual handicaps in personality dynamics

Consequently intellectual handicaps consist of:

- less short-term memory capacity
- lower abstraction level in the thought process, i.e. simpler and more concrete structures of space, time, quality, quantity and cause patterns, simpler forms of actions and thought operations, lower abstraction level in the symbolic function

Too much and too complex information make learning difficult even for people of normal intelligence.

These primary handicaps produce a number of secondary effects. Both the simpler structuring and the decreased short-term memory capacity make learning more difficult. It is very difficult to learn something if, for example, too much and too complex information is provided at one time. This is not just true for the intellectually handicapped, but their limitations are greater. On the other hand, if information is given an understandable structure and provided in suitable amounts, the intellectually handicapped do not have a problem as learning is normal.

The lower abstraction level in the thought process has the consequence that the knowledge learnt is simpler and more concrete less flexible. Flexibility is severely limited at level A, somewhat limited at level B and only limited to very abstract situations at level C.

The symbol function provides important support both for the individual's thought process and communication. This support for the thought process and memory is limited in relation to the degree of handicap. As long as the thought process is based on reality experienced in concrete terms, the lower abstraction level in the symbol function has a limited effect.

The attention and concentration on sensory impressions in intellectually handicapped people are normal in situations that they can survey and understand.

It should also be noted that intellectual handicaps do not primarily influence emotions, needs, emotional processing, attitudes and self-esteem. These factors are first and foremost influenced by the reception given tha handicapped person. Of particular importance is the emotional reactions from those around him and the respect accorded him as a person. Secondarily the various emotional functions can be influenced by the difficulties encountererd in recognizing and reaching the targets of one's needs. Limitations in the conceptions of time and space make planning more difficult to va varying extent dependent on the degree of handicap. If intellectually handicapped people receive individually adapted support and service, then secondary effects in the form of emotional disturbances and low self-esteem can be avoided.

An intellectually handicapped person's decision-making is based on a simpler and more concrete picture of reality. This can cause difficulties in situations where abstract concepts and thought operations are required to arrive at a satisfactory resolution. Intellectual limitations does not mean that the decision-making process is always dominated by the emotions. There are severely handicapped people who are governed by emotions, and others who suffer from severe emotional inhibition. Some are emotionally mature and can both make demands and show consideration as the occasion demands.

Studies of the relationship between intellectual handicaps and motor system disability show that the connections that exist have several causes. Motor system disability occurs more often among the intellectually handicapped than among other people, but this is mot primarily due to the intellctual handicap. The majority, even those who are very severely intellectually handicapped, have no or very slight motor system disability.

But the lives led by many intellectually handicapped people make them indolent and this influences their posture and movement patterns . A lack of meaningful activities, training and exercise negatively influences the development of the motor system. If these causes are disregarded there is almost no connection between intellectual handicaps and motor system disability.

INTELLECTUAL HANDICAPS AND INTERACTION

The need an individual has of special care is dependent on the complexity and stability of his environment. Someone who can handle a relatively simple situation can have great difficulty managing a more complicated one. The way the intellectually handicapped deal with their interaction with their environment depeds on the nature of their environment and how they are capable of handling it. Differences in their ability to deal with their environment are in part due to the conceptions and structures at their disposal. The methods of adaption vary with the intellectual levels, and this in its turn establishes different targets for home, school or work, and recreation.

The way the interaction with the environment functions depends on the degree of intellectual handicap and the demands the environment makes for abstract thought. For example, an intellectually handicapped person at level B can hardly handle money at all while a person at level C can manage quite well. At level C one cannot, however, understand such concepts as accounts or money transfers, e.g. that tax can be paid by postgiro, i.e. that money can disappear without it first being visible.

The adaption which results from interaction does not solely concern the picture an individual forms of the world around him' it also involves the picture he has of himself. This picture depends to a considerable extent on the way the environment reacts to him. It is the world around them that determines

whether the intellectually handicapped regard themselves as people who are liked and who are worth a place on earth or as apathetic creatures just there to be nursed.

The picture someone forms of themselves is due to a considerable extent to the reactions of the world around them.

Emotionally everybody senses, and this includes even severely handicapped people, the way they are regarded by other people. The interaction between the social and physical environment determines if the needs and emotions of the intellectually handicapped stimulate them and make them happy or if they cause despair and apathy.

There are four types of interaction, viz.: physical influences from the environment, understanding the physical environment, understanding the physical environment, dealing with the physical environment and communication with the social environment. I will now relate these to intellectual handicaps.

Influences from the physical environment

The physical influence of the environment on the intellectually handicapped is not normally due to the disability. There is no reason today to assume that food, sunlight, air, blows or tablets influence them in any way different from other people.

Biologically, the intellectual handicapped are equipped the same as everybody else.

At present there is no agent that can reduce or cure intellectual handicaps. However, there are other kinds of shortcomings that can result in the biological base of the thought process being dagamed, so that the abstraction level in thought is lowered. Mechanical or chemical injury, e.g. metabolic disturbances or undernourishment, can produce such effects.

Ability to understand the environment

The ability of the mentally retarded to understand their environment is naturally influenced. But this should not be taken to mean that their conceptions are confused or bizarre. As I said earlier, they are clearly structured, but simpler and more concrete. At level A the concrete reality is experienced, remembered and recognized. Its importance depends on the emotional values of the experiences.

This "recognize-understanding" develops at level B to "know category understanding" which involves experiences being classified in terms of e.g. furniture, lamps, textiles. When one sees a lamp that one has never seen before one understands that it is a lamp because one knows what sort of a thing it is. On the other hand, one does not spontaneously appreciate that things exist that one has not experienced first hand. This general insight first emerges at level C when one understands that there are lamps one has not seen and people one has not met.

Ability to deal with the environment

Muscle function is not normally an obstacle to the intellectually handicapped performing actions, with the exception of those who have the additional handicap of mobility impairment or those who are very untrained.

Actions are controlled by will, knowledge and self-esteem. Will is not inhibited by intellectual handicap and nor is self-esteem.

However, offensive treatment, over-protection and nursing routines can act negatively on the will and self-esteem, but that is another problem.

On the other hand, the knowledge structure reduces the control of actions. At level A actions are governed by simple associations in pairs or linked together in chains. Even at level B action routines are a guiding factor although a certain flexibility emerges. Thought operations including an overview are still impossible. These occur at level C, first tentatively and then more steadily. At level C the thought process presents no obstacle to actions in practical every-day life.

Ability to communicate

Only signal and body-language exists at level A. As signal- and body-language is central to emotional communication, an intellectually handicapped person has the same communication possibilities as a person of average intelligence, but fellow human beings sensitive enough to understand non-verbal communication relates very much to the situation here and now. It cannot refer to other places or events, but is quite feasible, depending on the sensitivity of those involved.

The possibilities of communicating increase enormously at level B as spoken language and pictures can be understood. At level C writing and reading are added which further improve the ability to communicate.

ALA (Adation to life and work) is a research group connected to The National Association for Retarded Children, Youngsters and Adults (RFUB). The research into mental retardation conducted by ALA is mainly of a psychological-pedagogic character. It attempts to describe the nature of the handicap, its psychological effects on cognitive delvelopment, how the individual and the environment interact and how the environment should be adapted to the intellectually handicapped.

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The Swedish Institute for the Handicapped is the central body dealing with aids for the disabled. The Institute performs surveys, research and development, testing, information dissemination and tuition concerning handicap aids and infrastructure planning for people with reduced capabilities. The Institute adapts vehicles and manufactures devices for disabled drivers. The Institute is financed by central and local government authorities.

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